GENERAL NOTES

WINTER BIRD OBSERVATIONS ON THE SOUTH ATLANTIC BIGHT, LONG BAY, SOUTH CAROLINA

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Introduction

Winter pelagic bird life off North Carolina's Cape Hatteras is well-documented. However, no significant pelagic bird surveys in winter have been attempted south of that providential confluence of the northward flowing Gulf Stream and southward flowing currents from the Mid-Atlantic shelf and slope regions. Winter weather typically restricts the range of day trips in small craft. In recent years, Georgia birders, along with personnel from the Skidaway Institute of Oceanography (SkIO) and NOAA's Gray's Reef National Marine Sanctuary (NOAA), have participated in winter pelagic trips aboard the research vessel *R/V Savannah*. These trips have resulted in the collection of anecdotal data on the distribution of birds over the continental shelf, especially with respect to the detection of tropical pelagic species. Ballance (1999) noted that almost all regularly occurring pelagic species on the South Atlantic Bight (SAB) are classified as tropical species, which typically forage alone or in small groups over wide areas of nutrient-poor water. However, in all seasons the authors have often observed concentrations of tropical pelagic species over "bait boils" -- schools of forage fish being pursued by subsurface predators and broaching the surface, thereby attracting many bird species.

In early 2012 the authors had the unique opportunity to join 3 extended (8-12 days) winter research trips aboard the *R/V Savannah*. The trips were organized by James R. Nelson of SkIO to study the persistent annual occurrence of a large phytoplankton bloom in an area of the continental shelf break known as Long Bay, off the coast of South Carolina at approximately lat 33.800 long 78.000. His team included oceanographers from the University of North Carolina and technical staff from SkIO. Each trip involved a series of transects to facilitate plankton research. Data collected during the trips included measurements of water depth, temperature, and salinity. The procedure for birders on these cruises was to ensure that one or more observers remained

on the bow from sunrise to sunset, weather permitting (and with short breaks). We theorized that if a persistent phytoplankton bloom were close enough to the surface, this would attract both sub-sea predators and pelagic birds, particularly Procellariiformes which are known to detect odors such as dimethyl sulfide associated with plankton, and thereby congregate to forage on schools of bait fish swimming at or just below the surface of these blooms (Nevitt 1999). We also theorized that any correlations detected between bird species occurrence and water depth, temperature, or salinity would indicate species preferences for particular ocean water masses (i.e., shelf waters of the SAB vs. Gulf Stream) and not necessarily to those individual hydrologic parameters. In the case of Long Bay, the more inshore waters should contain shelf waters of the SAB, and the more offshore waters would reflect characteristics of the Gulf Stream.

Survey Results

Cruise 1: 25 January-2 February 2012

Eugene Keferl and Buddy Campbell participated in the initial cruise from the SkIO to Long Bay. Two significant bird sightings occurred during 0700-1030 on 25 January. One Manx Shearwater (*Puffinus puffinus*) was spotted and the only Razorbill (*Alca torda*) of the trip was recorded. Unfortunately, the exact location and time of both of these sightings was not recorded. At no time during this cruise was chum used to attract birds. At 1045 on this date 2 Bonaparte's Gulls (*Larus philadelphia*), one Ring-billed Gull (*Larus delawarensis)*, and 8 Herring Gulls (*Larus argentatus*) accumulated around the boat, and a lone Pomarine Jaeger (*Stercorarius pomarinus*) appeared. The bird circled over the top of the boat and quickly left via the stern. This was the only jaeger observed on this cruise, and only 5 Manx Shearwaters were observed: one on 25 January while cruising to the first research station, 3 on 27 January at lat 33.807 long 78.074 while approaching the Cape Fear channel, and one on 28 January at lat 33.68 long 78.09 while leaving the Cape Fear channel. The last 4 birds were observed while in sight of land. All the birds were quick fly-bys low to the water.

Eighty-four Common Loons (*Gavia immer*) were observed on this cruise, most of which were swimming or diving. There did not appear to be any pattern to their distribution, as they were seen in water depth ranging from 16-243 m; however, most were found in waters between 30-35 m deep. Common Loon presence was not associated with schools of fish visible at the surface. One

Pacific Loon was observed (*Gavia pacifica*) on 31 January, the highlight of this cruise, sitting on the surface in water 35.69 m deep at lat 33.135 long 78.066.

One of the most common birds observed during the cruise was the Northern Gannet (*Morus bassanus*). We had 1302 sightings of this species, all of which were observed in 30-40 m of water; none were found beyond the continental break. On 31 January and 1 February the sea was especially calm, and many schools of fish were evident at the surface. It was during these 2 days that we observed the highest numbers of Northern Gannets. On 1 February, we started counting birds at 0815 as we headed on a bearing of about 139°. Numerous Northern Gannets, Red Phalaropes (*Phalaropus fulicaria*), and Bonaparte's Gulls passed by heading north. Surface schools of fish were evident in the flat waters, but the birds did not stop and feed. On this cruise, 1904 Red Phalaropes were counted. Very few were seen over waters that were more than 40 m deep. These birds feed on zooplankton at the surface, so water depth probably does not matter to this species.

All the Laughing Gulls (*Larus atrcilla*) observed on this cruise were in the Cape Fear channel. All Herring Gulls and Great Black-backed Gulls (*Larus marinus*) observed were following the *R/V Savannah* or other nearby boats and ships. Bonaparte's Gulls ($N = 460$) were present along most transects, with the largest numbers counted being 80 and 81 birds during 10-minute time periods. Only 3 were observed in waters deeper than 40 m. Small flocks of Bonaparte's Gulls were occasionally observed flying over schools of fish at the surface.

Cruise 2: 13-24 February 2012

Eric Bowles and Bill Lotz were on the second cruise, which left Skidaway Island at 1500 on 13 February. En route to Long Bay a Razorbill was observed and photographed at 1720 that same afternoon at lat 31.881 long 80.740 (i.e., within the coastal waters of Chatham County, GA). There were several other avian highlights on this cruise, despite the limitation of only 5 full days of observations on station due to high winds and heavy seas.

A Black-capped Petrel (*Pterodroma hasitata*) was observed and photographed at 1345 on 15 February at lat 32.863 long 77.888. The highlight on 16 February was a Great Shearwater (*Puffinus gravis*) seen and photographed at 1035 at lat 32.962 long 78.095. The most unusual species seen on 17 February was the last one of the day: an Audubon's Shearwater (*Puffinus lherminieri*) photographed at 1708 at lat 32.655 long 78.097 (Georgetown County, SC). Our last day on station was Saturday, 18 February. A Manx Shearwater was observed

and photographed at lat 33.309 long 77.911. Three more were photographed at lat 33.587 long 77.992 at 1130, 2 were seen at 1140 at lat 33.611 long 78.000, and 2 more at lat 33.686 long 78.021 at 1210. Also photographed during 1110-1210 were a total of 4 Razorbills. All these locations are in Brunswick County, NC, and were made as the *R/V Savannah* was running in to the Cape Fear River to take shelter from approaching high winds and heavy seas.

Black-capped Petrel, 15 February 2012, by Eric Bowles.

Among the more common species observed over Long Bay during the 5 days were Herring Gulls (by far the most common bird offshore), Red Phalarope, Bonaparte's Gull, Northern Gannet, Common Loon, and Red-throated Loon (*Gavia stellata*). As the boat neared the Cape Fear River Buoy on 18 February, 5 Parasitic Jaegers (*Stercorarius parasiticus*), numerous Royal Terns (*Sterna maxima*), and several large flocks of Forster's Terns (*Sterna forsteri*) were seen.

A Red-winged Blackbird (*Agelaius phoeniceus*) approached the boat and circled several times, but never landed, on 14 February at 1135. This was an unusual sighting so far from shore (lat 32.811 long 78.458, Georgetown County, SC) for this species. Other interesting observations during the cruise included Atlantic Spotted Dolphin (*Stenella frontalis*) on 15 February, Atlantic Bottlenose Dolphin (*Tursiops truncates*), 2 Green Sea Turtles (*Chelonia mydas*) and one Loggerhead Turtle (*Caretta caretta*) on 16 February.

Great Shearwater, 16 February 2012, by Eric Bowles.

Cruise 3: 14-21 March 2012

Steve Calver was the lone bird observer on the third cruise, and he elected to use a somewhat rigorous sampling methodology: counts per 10 minute interval, counts per linear km sailed, and counts per km^2. He assumed that he could accurately survey a distance of 1 km to port and starboard when the ship was underway, and a 4 km^2 area when the ship was stationary. When the ship was underway, only new birds were counted. Observations were taken every 10-20 minutes when the ship was stationary, everything was counted during each interval, and then average counts for a 10-minute interval were calculated.

Some interesting patterns emerged when the data were analyzed. Common Loons, Northern Gannets and Red Phalaropes were often seen at the same time and were found in 2 separate areas within the survey site, centered at about lat 33.1 long 78.5 and lat 32.2 long 79.7. Analysis of data collected by SkIO indicated that these 2 areas were associated with the lowest water temperatures recorded during the cruise, with the phalaropes found mostly in water temperatures from 18-21º C, Common Loons in water temperatures from 18-23º C, and Northern Gannets in water temperatures from 18-24º C. The phalaropes were seen mostly

in the northwest portion of the survey area, with Common Loons extending somewhat further to the southeast, and Northern Gannets extending even further to the southeast.

In areas where they were recorded, Common Loons averaged 1.1 birds/km^2 (N = 76, range 0.1-5.1 birds/km^2) and were typically found in ocean depths of 21-38 m (maximum of 54.7 m). The high count was 125 observed on 18 March. When observed, Northern Gannets averaged 0.76 birds/km^2 (N = 107, range 0.06-6.05 birds/km^2). Most Northern Gannets occurred where ocean depths ranged from 21-49 m, but a few were found in deep water (about 275 m) far offshore. The high count for gannets was 189 recorded on 15 March. When observed, Red Phalaropes averaged 25 birds/km^2 (N = 65, range 0.2-170 birds/km^2), and usually occurred in ocean depths of 21-36.8 m. The high count was 3367 phalaropes recorded on 18 March.

Black-capped Petrels were found in an area centered on lat 32.3 long 77.5, mostly in water temperatures >25.0ºC (i.e., some of the highest water temperatures encountered) and depths of 277-728 m (i.e., the deepest depths encountered during the survey). When observed, Black-capped petrels averaged 0.36 birds/km^2 (N = 17, range 0.12-2.0 birds/km^2). They were generally found further offshore than Manx Shearwaters. A total of 27 individual petrels were identified (most photographed), all on 20 March. Manx Shearwaters were found within a narrow band of ocean at the high end of recorded water salinity (36.1-36.4 ppt; the highest salinities recorded during the survey). Most were found near lat 33.0 long 78.3, with no apparent correlation to water temperature, or depth (25.6-625 m). Observations of Manx Shearwaters averaged 0.5 birds/km^2 (N = 32, range 0.02-1.3 birds/km^2). In general, their occurrence appeared to extend southeast of the phalaropes, Common Loons, and gannets. The high count recorded was 19 on 15 March. Fourteen other small unidentified shearwaters were also encountered during the survey. One Cory's Shearwater was found on 17 March in a water temperature of 20.5º C, 36.3 ppt salinity, and a depth of 30.8 m, at lat 33.17 long 78.34.

Herring Gulls were distributed in small numbers indiscriminately throughout the cruise, with a high count of 37 recorded on 18 March. One Iceland Gull (*Larus glaucoides*) was observed on 21 March at about lat 32.43 long 78.83 in 110 m of water at a water temperature of 23.4º C, and a salinity of 36.1 ppt. Two Bridled Terns were observed on 21 March at an ocean depth of 26.7 m near the western edge of the survey area, sitting on debris in the only large patch of sargassum encountered. The position was approximately lat 33.055 long 78.587.

Iceland Gull, 21 March 2012, by Steve Calver.

Land birds seen during this third cruise included Great Blue Heron (*Ardeus herodias*) at lat 33.030 long 78.571 (18 March) and Barn Swallow (*Hirundo rustica*) at lat 32.937 long 78.100 (16 March) and at lat 33.055 long 78.587 (18 March). Birds that landed on the ship included Northern Flicker (*Colaptes auratus*) at lat 32.706 long 78.210 (19 March), Common Yellowthroat (*Geothlypis trichas*) at lat 32.896 long 78.436 (18 March), Song Sparrow (*Melospiza melodia*) at lat 32.791 long 77.951 (19 March), Savannah Sparrow (*Passerculus sandwichensis*) at lat 33.172 long 78.344 (17 March), and Red-winged Blackbird at lat 33.333 long 78.092 (14 March).

Conclusions

Our three surveys represent the first time that extended winter observations of pelagic birds off the SAB were achieved. Unfortunately, the winter phytoplankton bloom often recorded in this area, known as Long Bay (on the shelf break off the coast of South Carolina), never materialized, probably diminishing the number and abundance of species and birds we might have detected. We propose that the species we did find (Tables 1 and 2) could be

representative of pelagic bird life elsewhere along the SAB during winter. Among the highlights of these trips were three unexpected shearwaters: Cory's, Great, and Audubon's. All 3 of these species are normally seen in warmer months throughout the SAB, but we are unaware of any previous records of their presence during the winter months. Six species of gull were identified, the rarest of which was Iceland Gull. One goal of these cruises was to determine the presence of species which have not been previously recorded in the SAB, or seen only circumstantially during opportunistic one-day birding excursions. In that regard we were successful.

Researchers have previously documented the presence of Black-capped Petrel on the shelf break during winter. The abundance trends from these cruises is consistent with those of Haney (1987), who found Black-capped Petrel associated with upwellings and eddies along the Gulf Stream, restricted to a band between 28-35ºN lat. Heretofore, Razorbill has been thought by local observers to be irruptive into the SAB from their typical northern latitudes only during particularly cold winters, yet we found 5 Razorbills during relatively mild, albeit windy, weather. Tropical waters, those that achieve temperatures of 23º C or more for at least part of the year, have proven to be a significant barrier to the southward dispersal of this species (Ballance 1999, Gaston 2004).

Bird species found within each major ocean mass (i.e., shelf waters of the SAB vs. Gulf Stream) appeared to be more or less randomly distributed within those currents. A more in-depth analysis of the boundaries and the hydrologic characteristics (i.e., salinity, temperature, and water depth) of these ocean currents would have to be accomplished in concert with bird distribution surveys in order to identify correlations, if they exist. Winter surveys of seabird diversity and abundance will continue to be slave to weather and to problems with accessing a vessel capable of being on station for extended periods of time. In future surveys, we recommend that the methodology utilized here by S. Calver be employed by every team of observers.

Since the biomass of phytoplankton in a given area of sea is thought to be the significant factor determining the presence of many seabird species, we hope to have the opportunity to return to Long Bay on a multiday cruise during a more normal winter in order to make comparisons with these findings. Ideally, we would capture individuals of specific species, tag them, and then compare their locations and activity patterns with hydrologic and phytoplankton data collected by SkIO and NOAA.

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Table 1. Pelagic species and numbers recorded during 3, 8-12-day pelagic cruises off the South Atlantic Bight (Long Bay), South Carolina, 25 January-21 March 2012.

Common Name	Cruise 1	Cruise 2	Cruise 3
	25 January- 2 February	13-24 February	14-21 March
Red-throated Loon		1	
Pacific Loon	1		
Common Loon	74	24	293
Black-capped Petrel		1	27
Petrel species			4
Cory's Shearwater			1
Great Shearwater		2	
Manx Shearwater	1	4	45
Audubon's Shearwater		1	
Large shearwaters			3
Small shearwaters			14
Northern Gannet	1251	234	315
Red Phalarope	1388	794	6077
Laughing Gull			1
Bonaparte's Gull	329	662	624
Ring-billed Gull	1		
Herring Gull	75	222	157
Iceland Gull			1
Great Black-backed Gull	3		
Gull species	12		
Forster's Tern		2	
Bridled Tern			2

Table 2. Pelagic species and numbers recorded in-transit to Long Bay (off the South Carolina coast) from Skidaway Island, Georgia, during 3, 8-12-day pelagic cruises, 25 January-21 March 2012.

Common Name	Cruise 1	Cruise 2	Cruise 3
	25 January- 2 February	13-24 February	14-21 March
Red-throated Loon	14	3	
Common Loon	10	4	
Manx Shearwater	4	4	
Northern Gannet	51	44	
Red Phalarope	516	24	
Laughing Gull	10		
Bonaparte's Gull	131	110	
Ring-billed Gull	1		
Herring Gull	7	12	
Forster's Tern	15	121	
Parasitic Jaeger		5	
Razorbill	1	3	